Oroville Facilities Relicensing
Operations Modeling Workshop #4

February 11, 2004

Workshop Agenda

- Welcome and Introduction
- Overview of Modeling Workshop
- Benchmark Results (Existing Conditions)
- Scenario 17 Update
- Discussion
- Next Steps
- Discussion with Modeling Team
- Adjourn

Participation Principles

- Participate – Attend the Workshop
- Learn – Learn about resources, people, roles, and process
- Represent – Bring issues and interests forward from others whose interests you share
- Cooperate – Work with others in the Workshop to share information and consider options
- Educate – Report back to others who share your interests

Workshop Ground Rules

- Commit to Being Fully Present
  - No cell phones, pagers, voicemail, etc.
  - Ask for what you need from the seminar and participants
- Honor Our Time Limits
  - Keep comments and discussion concise
  - Stay focused on the topic – Use the parking lot for other issues
- Respect Each Other
  - Listen carefully to other participants
  - Respond to ideas and issues, not individuals
- Support Constructive Discussion
  - Suggest improvements and solutions
  - Build on others' ideas – Use "and" instead of "but"

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Topics Covered in Previous Workshops

- Workshop (Seminar) #1 – June 24, 2003
- Workshop #2 – August 12, 2003
- Workshop #3 – October 20, 2003
- A learning experience and living process for sharing information and communicating ideas

Topics Covered in Previous Workshops

- Workshop #1 (Seminar) – June 24, 2003
  - Model Basics to Philosophy
  - Operations Model Suite
  - Modeling Request Protocol

Topics Covered in Previous Workshops

- Workshop #2 – August 12, 2003
  - Model Basics to Philosophy (repeat)
  - Benchmark Study (focus: CALSIM II)
  - Matching Results with Interest Groups' Needs
  - Introducing Posters as visual aid
  - Providing Panel of modeling specialists for questions/comments

Topics Covered in Previous Workshops

- Workshop #3 – October 20, 2003
  - Initial Benchmark Study Results
    - Establishing all the details for the Benchmark Study
      - Process for reviewing the benchmark study assumptions and results
      - Logic of temperature control actions
      - Data organization and distribution protocol
    - Introducing results from local operations model and temperature model for selective years
  - Sensitivity Analysis
    - Scenario 17 – Downstream extent of temperature control (summer months)
    - Scenario 13 – Reservoir level v. SWP demand level
    - Scenario 1 – Effects from eliminating pump back operations (interim results)

About this Workshop

- Workshop #4 – February 11, 2004
  - The BIG surprise (a bomb)
  - Existing Conditions Benchmark – all necessary corrections have not been completed.
  - An update on Scenario 17
    - Revised accretion/depletion along the Feather River
    - Adding considerations for spring months in Scenario 17A, per comments received in Workshop #3

About this Workshop

- Workshop #4 – February 11, 2004
  - Discussion Format
    - No Break-out Sessions, but...

      Break-out sessions are planned for future workshops
    - Modeling Results

      Check with Lori Brown in near future for availability
    - Poster Handouts

      References for the future
      Only new and updated posters available at the workshop
      Others, please check the Oroville Relicensing Website

Disseminating Modeling Results

- Modeling Result Format
  - Presentation (workshop): Summary Results
  - Poster: Summary Results with a Brief Introduction and Summary of Findings
  - Report: Detailed Discussion on Modeling Approach, and Findings
  - Database: Complete Results and Summary Tables and Plots;
    - Requests through E&O Workgroup Contact: Lori Brown

Preliminary Results, Subject to Revisions – for Collaborative Process Only

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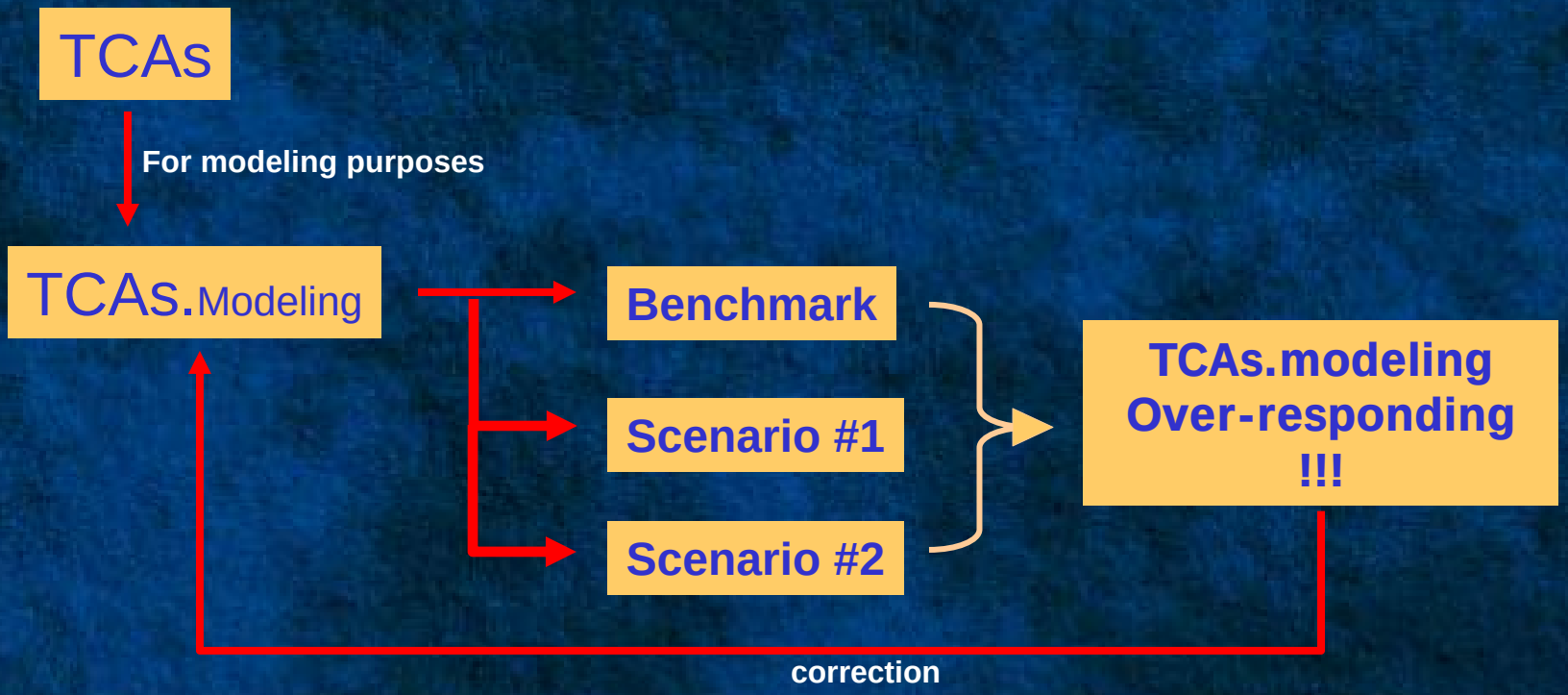
Zigzag Path to Benchmark

- Art's true story – the ugly truth about modeling

Torturous Path to Benchmark

- Lori's true story – the really nasty truth about implementing temperature control actions



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Scenarios 17 and 17A

- Objective
  - Investigate the downstream limits of temperature control in the high-flow section of Feather River from Thermalito Afterbay outlet to confluence with the Sacramento River by operation of the Oroville Facilities.
- Seasons of concern
  - Scenario 17 for summer (July - September)
  - Scenario 17A for spring (April - June)

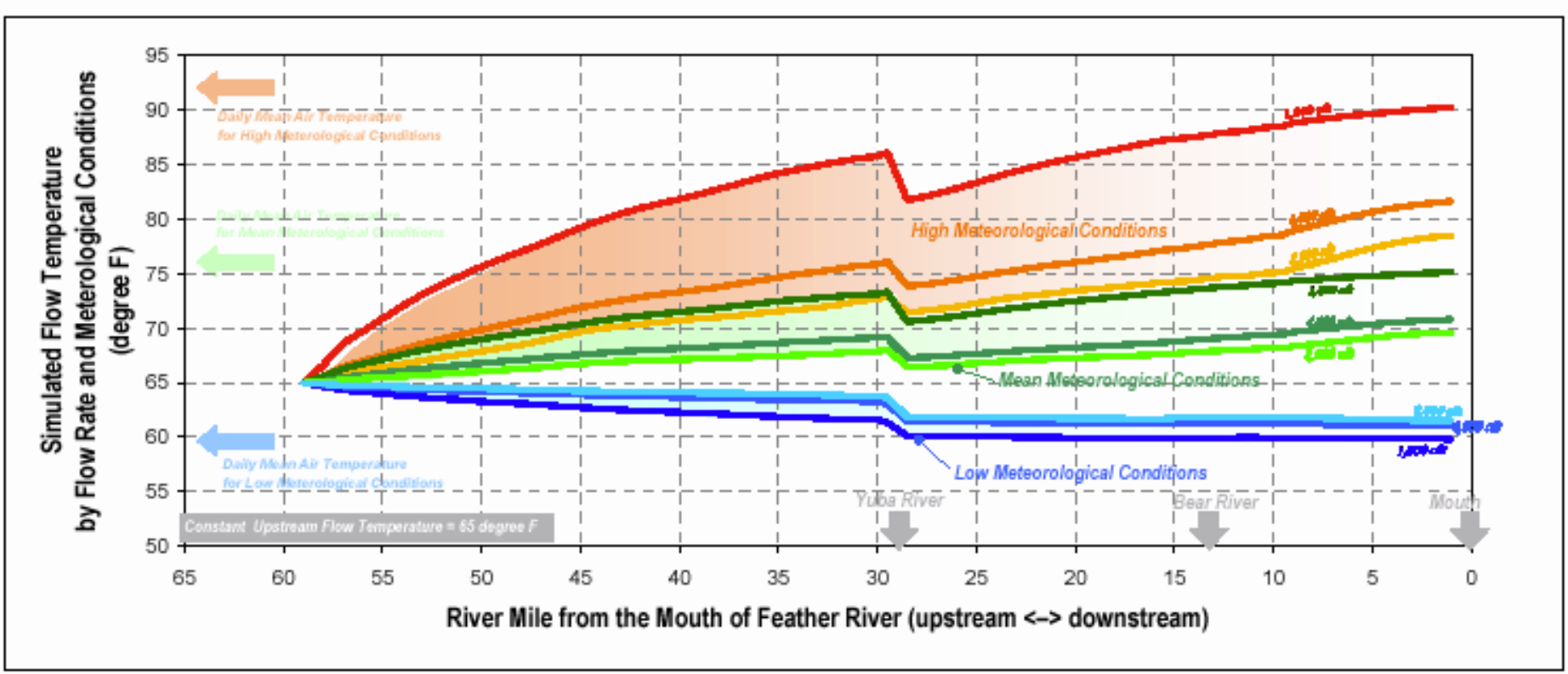
Scenarios 17 and 17A

- Approach
  - Sensitivity analyses with WQRRS only.
  - The diurnal variations of shortwave radiation, longwave radiation and dew point temperatures were developed based on 14-year records.
  - High, and low meteorological conditions represent the upper and lower bounds of a range with about 95 percent of occurrence.
  - Headwater flows and temperatures were selected to bracket typical historical conditions.
  - Tributary flows were derived from historic data. Their temperatures are based on correlations with ambient air temperatures.

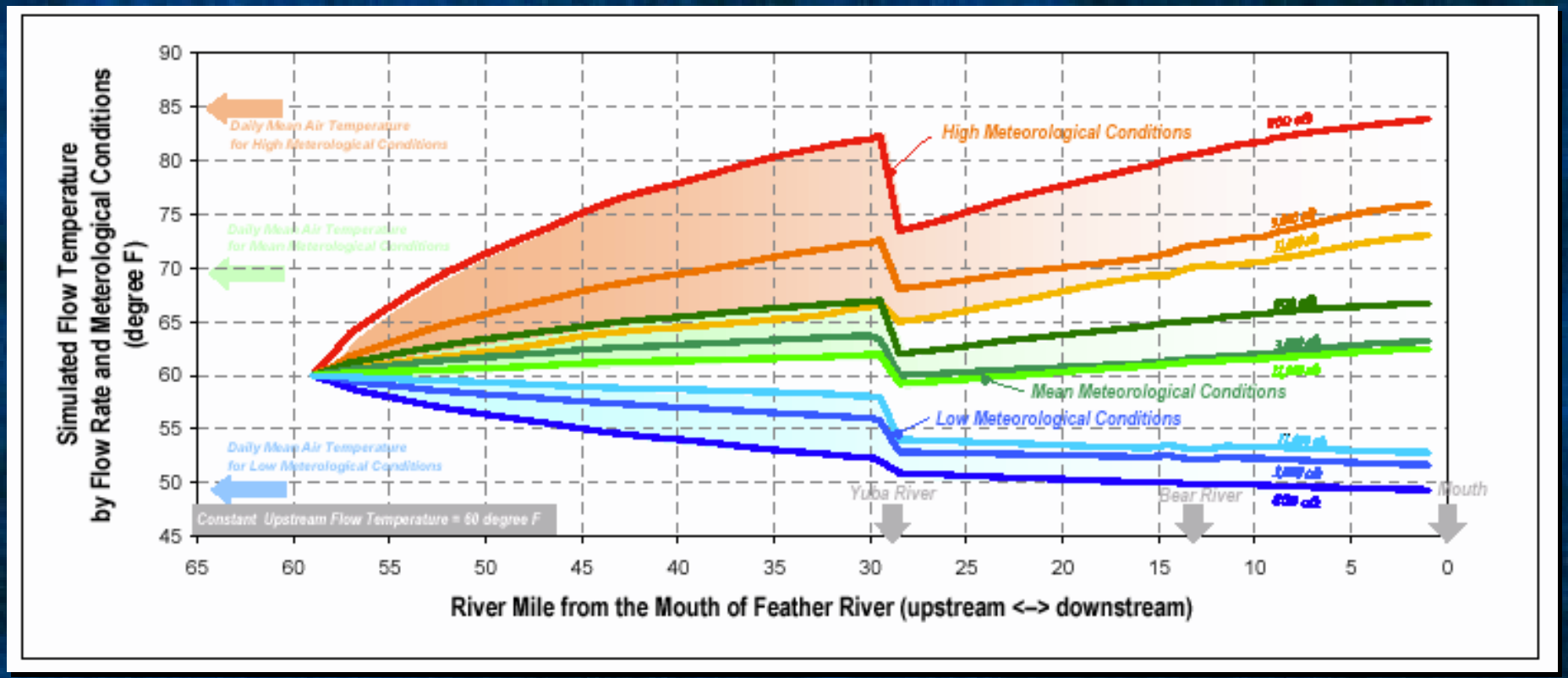
Scenarios 17 and 17A

- Findings
  - Similar findings for Scenario 17 and 17A.
  - Weather conditions are dominating in general.
  - Increasing flow can help but may not sustainable.

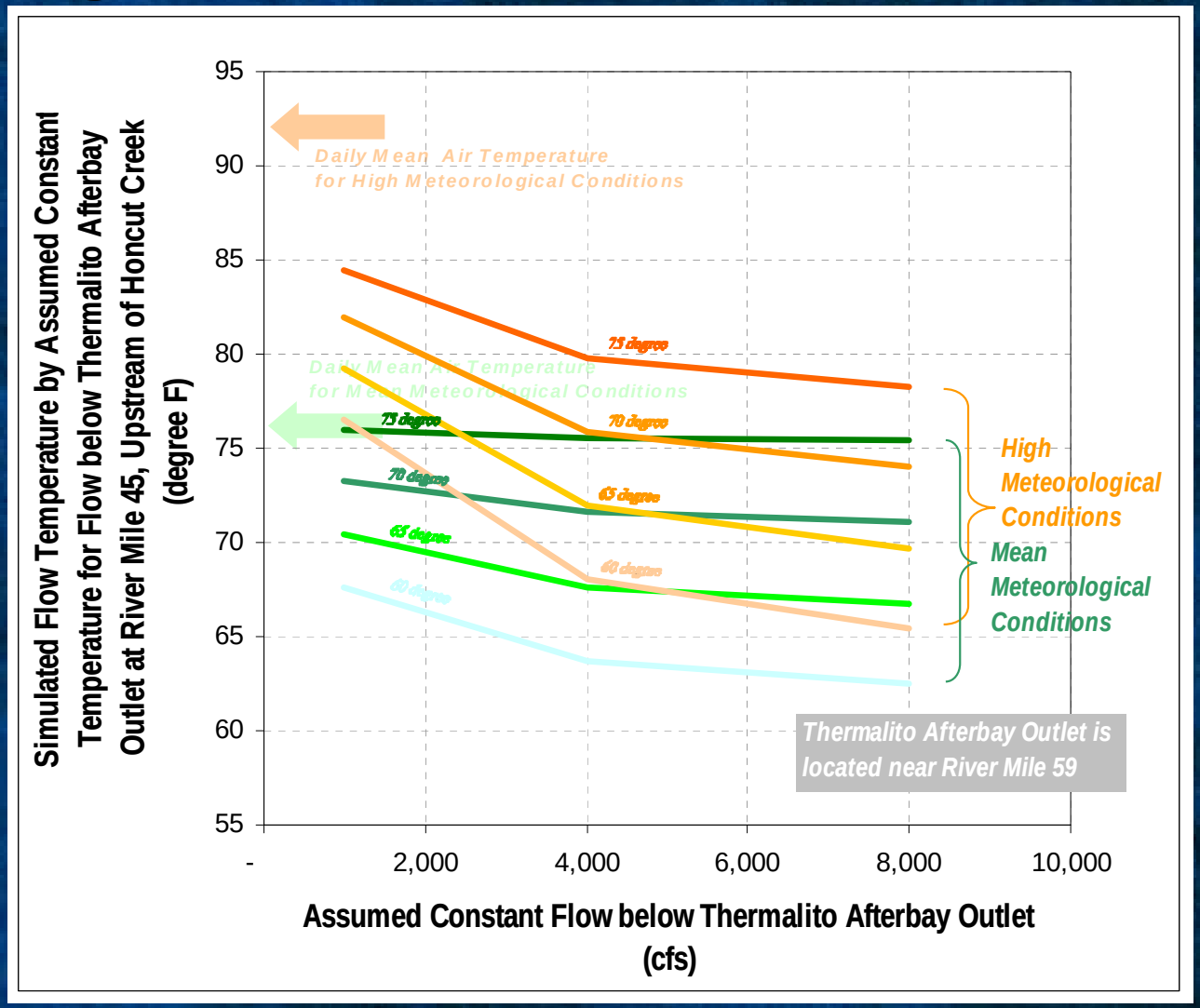
Temperature Control Effects by Flow (Summer, Scenario 17)



Temperature Control Effects by Flow (Spring, Scenario 17A)

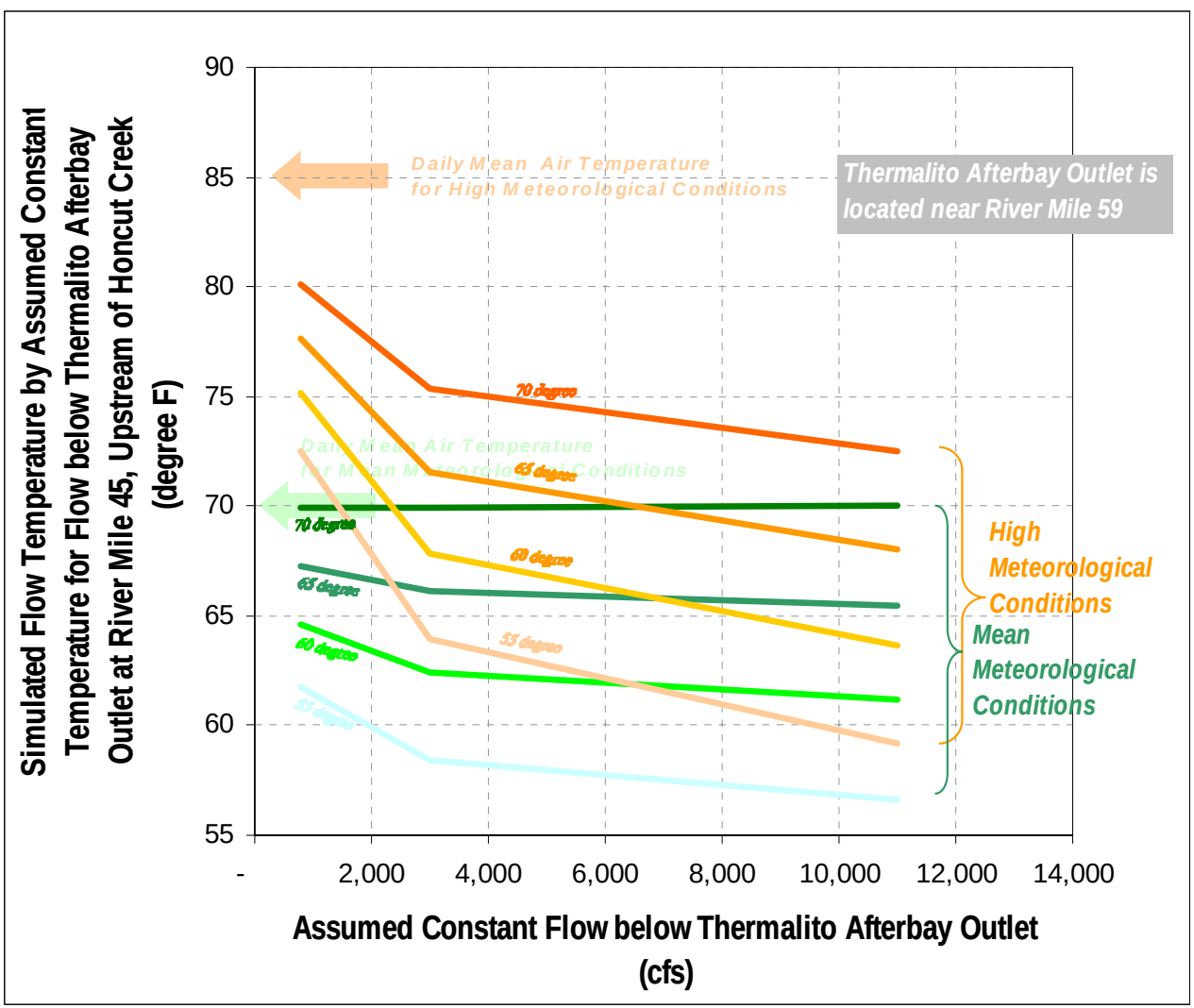


Temperature Control Effects by Flow (Summer, Scenario 17)



Feather River above Honcut Creek

Temperature Control Effects by Flow (Spring, Scenario 17A)



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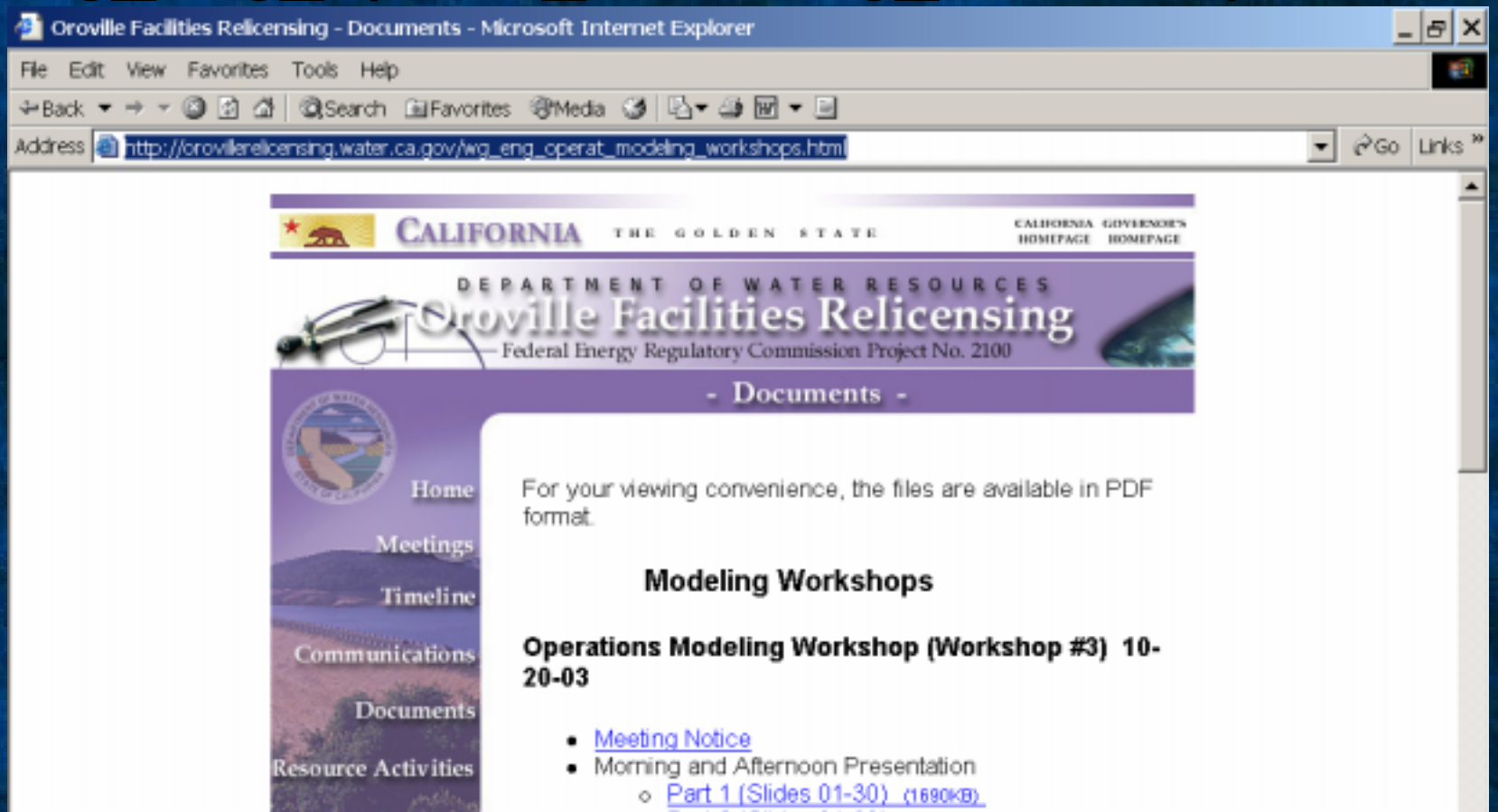
Information for Previous Workshops

- http://orovillerelicensing.water.ca.gov/wg_eng_operat_modeling_workshops.html



Top 7 Lessons Learned
from Modeling for Oroville Relicensing

7. Use extreme measures to test a hypothesis
   - Favorable/unfavorable conditions
   - Periods that really matter
6. There is no one-size-fit-all set of Temperature Control Actions
5. It takes millions of keystroke to do a scenario, even when you do all the things right
4. Models have no mercy, pointing out our blind spots at critical time

Top 7 Lessons Learned
from Modeling for Oroville Relicensing

3. As soon as a modeling scenario is complete (or before), it becomes obsolete

2. The best modeling workshop is the one without an agenda

1. New lessons coming soon

Discussion

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Next Steps

- Benchmark Study
- Next workshop?
  - March 19, 2004
  - What will be discussed in the next workshop?
    - Scenario 23
      - Scenario based on Flow-Temperature Task Force's recommendations
      - Currently developing study plan and details
    - Finish sensitivity scenarios that are still relevant

Additional Information

Operations Modeling Coordinator

Mr. Curtis Creel, P.E.
Department of Water Resources
(916) 574-2722
clcreel@water.ca.gov

Modeling Documentation and Administration

Ms. Lori Brown, P.E.
Department of Water Resources
(916) 653-6124
lbrown@water.ca.gov

Relicensing Web Site:
orovillerelicensing.water.ca.gov

Relicensing Email Address:
orovillep2100@water.ca.gov

Free discussion with Modeling Team